SRS LS-2 & LS-3 PRESENTATION

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SRS SYSTEM IN LS-3

PACKED DISTILLATION COLUMN DETAILS

Capacity's (Dia)	750 mm	900 mm
No of Columns	02	02
Column Height	21348 mm	21640 mm
No of Segments	04	04
Packing Type	FXpack 7.5 L (750Y)	FXpack 7.5 L (750Y)
Packing Height	18490 mm	17200 mm
Packing Thickness	0.1 mm	0.1 mm

EXISTING FACILITY

- Dedicated storage tanks for Solvents
- Dedicated solvent Transferring lines from Production block & SRS
- Control valves with alarm and Interlock system- Semi Automation
- Testing of Purity by G.C system

MAJOR SOLVENTS

- ETHYL ACETATE
- ISOPROPYL ALCOHOL
- METHANOL
- ACETONE
- ACETONITRILE
- METHYLENE DICHLORIDE
- TOLUENE
- N-Heptane
- Ethanol

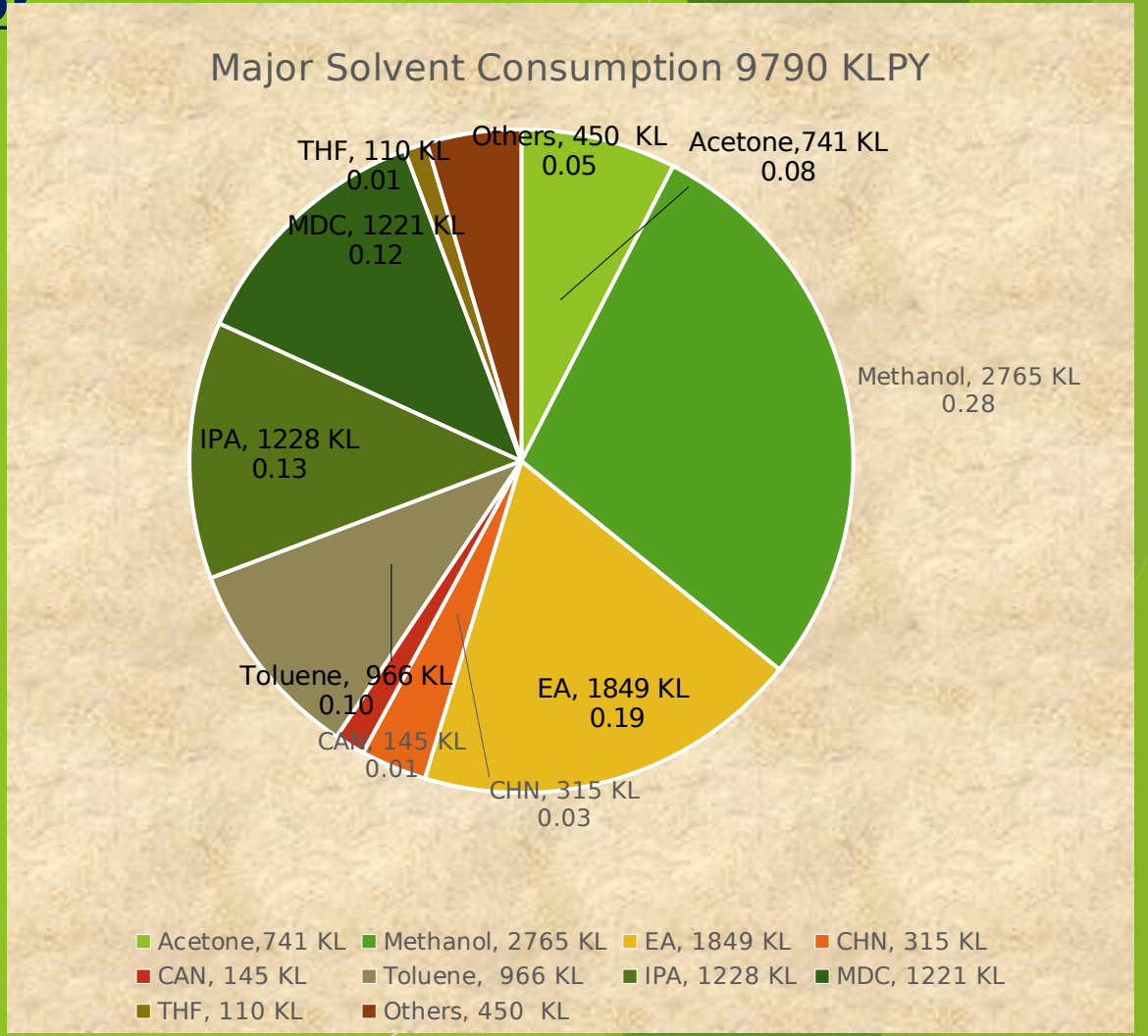
PRODUCTIVITY

LS-3 SRS Column Design Capacity: 800 - 850

Month	Productivity (KL)
April	27
May	376
June	337
July	409
August	390
September	540
October	610
November	577
December	537
Jan-24	707
Feb-24	710
Mar-24	801
Apr-24	803
May-24	660
June-24	702.4
July-24	746.5
August (Target)	850

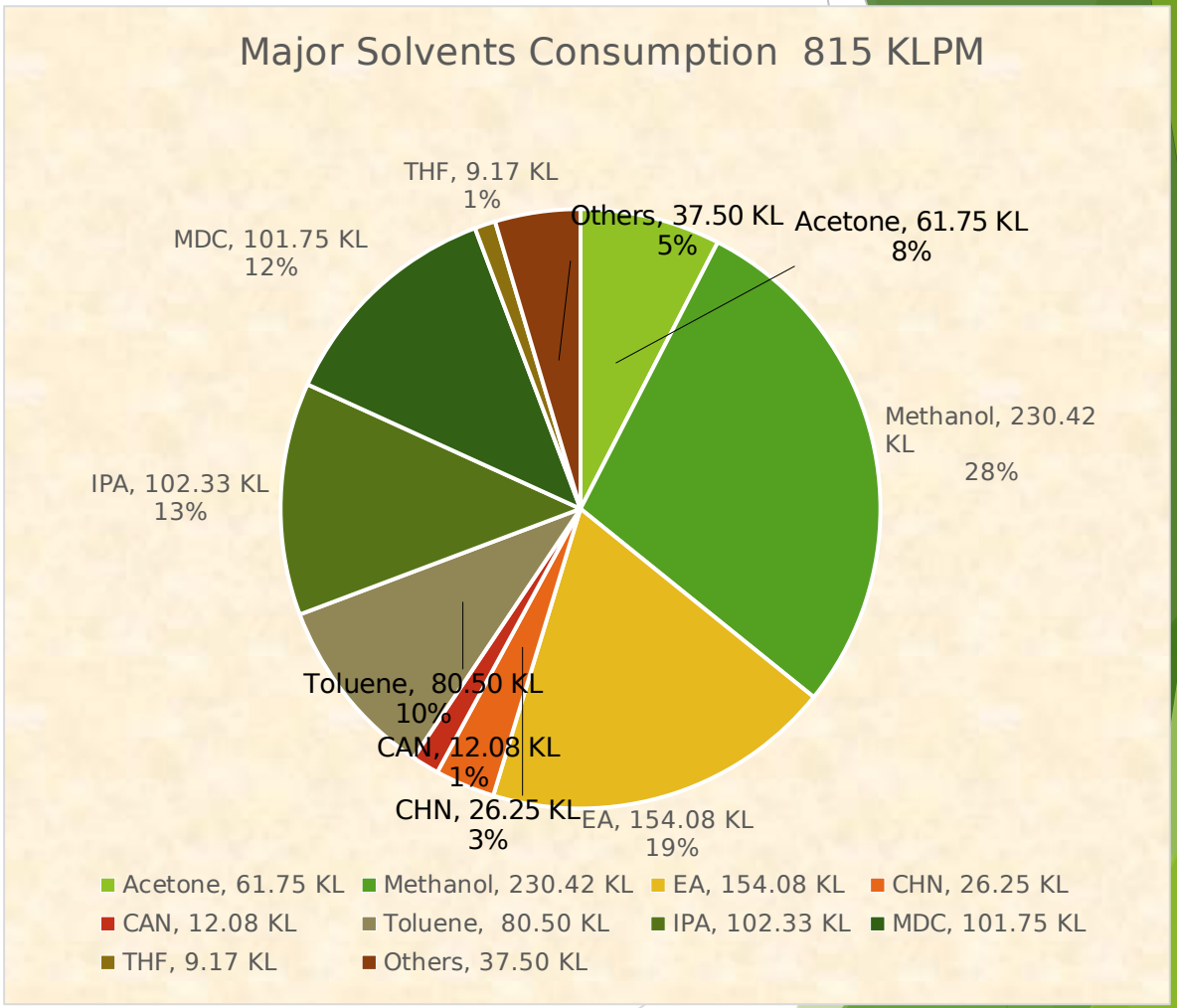
Executive Solvents Summary- Yearly in MSNLS-III Biknoor

Description	Quantity (KL)	Value (Cr)	Percentage (%)
Fresh solvents procurement per Annum	9887	61.78	--
Avg. Solvent procurement per month	**824**	**5.14**	**--**
Opening stock	**460.23**	**4.6**	**--**
Column Distilled Recovery	**6824**	**68.2**	**71.13**
Outside Recovery	**200**	**2.45**	**2.08**
Sales	**870**	**0.87**	**7.83**
Closing stock	**753**	**7.53**	**--**
Losses	**1700**	**17**	**17.72**



Executive Solvents Summary- Monthly in MSNLS-III Biknoor

Solvent Consumption			
Solvnet Name	Per month (KL)	Per Year (KL)	Percentage
Acetone, 61.75 KL	61.75	741	7.57
Methanol, 230.42 KL	230.42	2765	28.24
EA, 154.08 KL	154.08	1849	18.89
CHN, 26.25 KL	26.25	315	3.22
CAN, 12.08 KL	12.08	145	1.48
Toluene, 80.50 KL	80.50	966	9.87
IPA, 102.33 KL	102.33	1228	12.54
MDC, 101.75 KL	101.75	1221	12.47
THF, 9.17 KL	9.17	110	1.12
Others, 37.50 KL	37.50	450	4.60
	815.83	**9790**	100.00

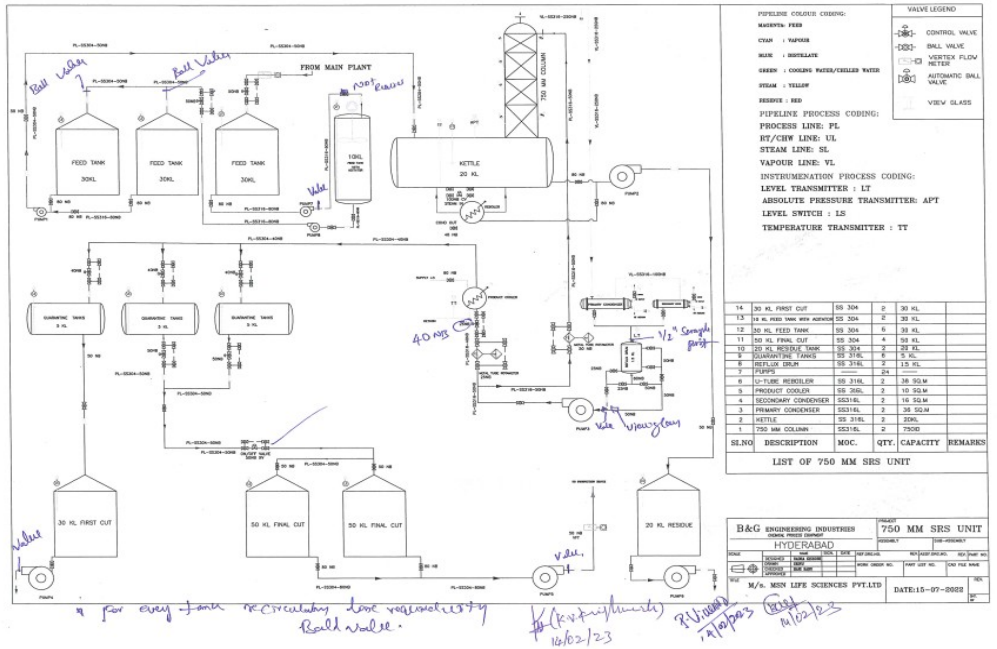


Existing Solvent Recovery System (Batch columns)

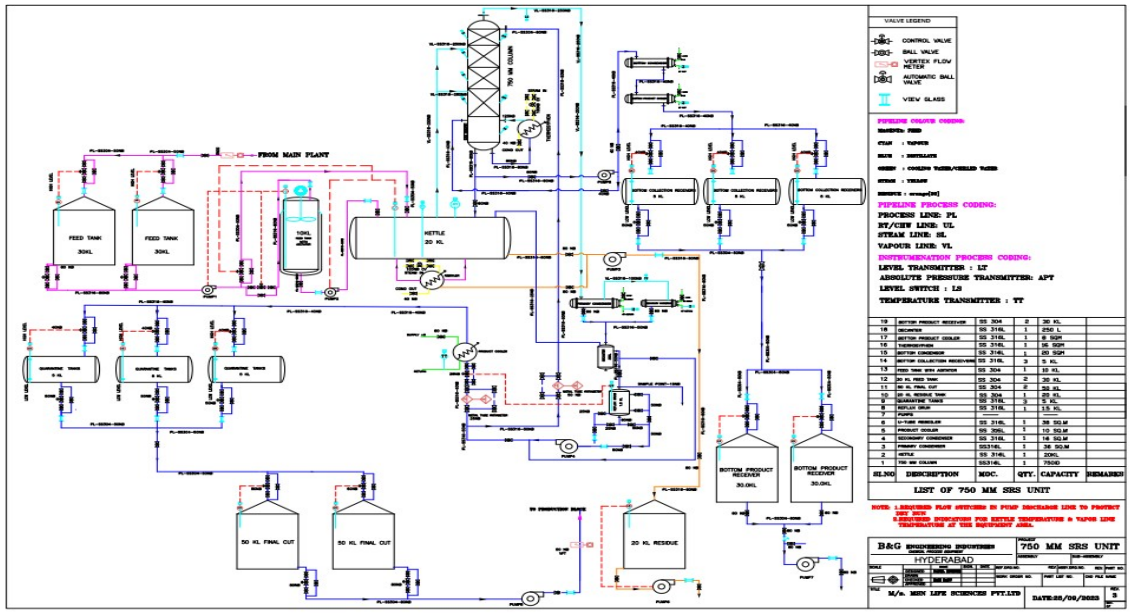
1	Existing Solvent recovery is for only batch column
2	With out adequate automation - Safety interlocks & process controls
3	Can be utilize only for top collections
4	Can be handled only up to 150 - 200 KL spent/month
5	Batch cycle time is more and recovery percentage is lower side
6	Utility and operating cost is more

Proposed Solvent Recovery System (With Continuous top & bottom collections)

1	Modified column can be used for both batch, continuous and semi continuous
2	Adequate automation - Safety interlocks & process controls were considered
3	Can be utilize for both top collections & Bottom collections
4	Can be handled up to 300 - 500 KL spent/month
5	Batch cycle time will be less and recovery percentage will be higher side



COLUMN WITH THERMOSYPHON P&ID



LS-3 SOLVENT RECOVERY SYSTEM PERFORMANCE

Last 7 Months (SEP-2023 To MARCH-2024)	Coming 7 Months (APRIL-2024 To OCT-2024)
1. SRS productivity increased from 390 KL (Aug-2023) to 801 KL(March-2024). i.e 105%.	1. SRS productivity to be increased from 801 KL to 850 KL (Oct-2024).
2. Column efficiency increased due to boil up increased from 3000 to 4500 Lt/hr and reduced the cycle time.	2. Column efficiency increased due to boil up increased from 3000 to 4500 Lt/hr and reduced the cycle time. Same will be maintained.
3.Daily Meetings conducted with shop floor team and explained about technical and safety awareness in working area.	3. Daily Meetings conducted with shop floor team and explained about technical and safety awareness in working area.
4. SRS Column Distilled Recovery (SAP Vs Physical) variation quantity equal.	4. SRS Column Distilled Recovery (SAP Vs Physical) variation quantity equal. Same will be maintained.
5. SRS Documentation one Column (Column -2) Validation (PBLN1 Methanol Solvent) completed.	5. Remaining 3 Columns Validation will be completed within 2 months.
6. LS-2 New Columns (10 No’s) project budget approval follow up	6. LS-2 New Columns (6 No’s) project execution
7. LS-3 Reactor Column planning and follow-up.	7. LS-3 Reactor Column planning execution.
8. Batch Columns installed in Pharma Chem Unit.	8. Columns to be transferred to LS-3 for erection, installation and modification with additional equipment’s for Bach and continuous mode process budget approval follow up.

LS-3 SOLVENT RECOVERY SYSTEM PERFORMANCE

Last 7 Months (SEP-2023 To MARCH-2024)	Coming 7 Months (APRIL-2024 To OCT-2024)
9. Monthly Production planned as per the Production monthly schedule, with coordination of block heads.	9. Monthly Production planned as per the Production monthly schedule, with coordination of block heads. Same will be maintained.
10. Previously we used HDPE pipes for Solvents loading and unloading purpose. Now we planned dedicated lines for Solvent loading and unloading.	10. Stainless Steel Flexible Hose pipes (3 meters length) planned for tanker loading and unloading.
11. Methanol Fraction-1 (Methanol + Toluene mixture) Liquid Liquid Extraction completed. (i.e Methanol: 30 KL (Cost: 7.5 Lakhs), Toluene: 15 KL (Cost: 11.9 Lakhs))	11. Methanol Fraction-1 (Methanol + Toluene mixture) Liquid Liquid Extraction completed. Further it will be maintained.
12. Ethyl Acetate fractions recycled and increased the straight yield i.e 2000 Liters per batch. (73 to 85%) (Total Qty. (L) – 160 KL; Cost: 1.2 Cr)	12. Ethyl Acetate fractions will be recycled and increased the straight yield i.e 2600 Liters per batch. (85 to 88%)
13. Fresh Solvent consumption by comparing the previous months it was reduced gradually.	13. Further Fresh consumption in production blocks will be reduced.
14. SRS Columns Condenser descaling planned every month, for this reduced the cycle and solvent loss quantity.	14. Continuous follow-up with Engineering team, as per their suggestion RT Cooling tower Blow down nozzle position will be changed. Based on this cooling tower efficiency was increased.
15. Ethanol Solvent accumulated in drum yard – 200 KL. Total quantity segregated and placed in	15. Molecular Sieve Drier will be planned.

LS-3 SOLVENT RECOVERY SYSTEM PERFORMANCE

Last 7 Months (SEP-2023 To MARCH-2024)				Coming 7 Months (APRIL-2024 To OCT-2024)		
Solvent Name	Stage	% Yield increased		Solvent Name	Stage	% Yield (Target)
		From	To			
Methanol	AMHA1	61.80	64.01	Methanol	AMHA1	68
Acetone	CGBH2	71.68	74.83	Acetone	CGBH2	78
Acetone	VGPT2	74.0	--	Acetone	VGPT2	76
Acetone	DGT1	68.23	73.78	Acetone	DGT1	78
Ethyl Acetate	RSC2B	73.58	85.00	Ethyl Acetate	RSC2B	90
Ethyl Acetate	LDC1	--	87.00	Ethyl Acetate	LDC1	90
Ethyl Acetate	DGT1	--	76.00	Ethyl Acetate	DGT1	80
Acetonitrile	ATSC2	59.68	64.44	Acetonitrile	ATSC2	68
Cyclohexane	CTPS	83.00	--	Cyclohexane	CTPS	86
IPA	ATSC1	62.50	64.66	IPA	ATSC1	68
IPA	ATSC2	66.00	69.42	IPA	ATSC2	73
IPA	CGBH1	65.00	68.43	IPA	CGBH1	71
IPA	VIGB2	73.00	76.58	IPA	VIGB2	79
IPA	RSC2B	54.00	63.00	IPA	RSC2B	65
IPA	STPM3	71.00	--	IPA	STPM3	75
IPA	VGPT2	56.52	58.00	IPA	VGPT2	60
IPA	OSM	--	65.00	IPA	OSM	68
IPA	PBLN	--	68.43	IPA	PBLN	71
MDC	OSM3	75.60	78.40	MDC	OSM3	85
MDC	VGPT2	84.00	85.19	MDC	VGPT2	88
MDC	DGT1	88.00	90.11	MDC	DGT1	95
MDC	DEM3	--	84.00	MDC	DEM3	88
Toluene	CGBH1	--	75.60	Toluene	CGBH1	78
Toluene	LDC1	--	82.00	Toluene	LDC1	85
n-Heptane	FNDA1	--	60.00	n-Heptane	FNDA1	65
Average (%)		**69.85**	**73.35**	**Average (%)**		**77.12**

ACHIEVEMENTS

- Distillation Boil up increased from 3000 To 4500 Lts / Hr.
- Ethyl Acetate Fraction accumulated quantity recycled.
- Blow leg arranged in Reflux Receiver.
- Ethyl Acetate distillation cycle time reduced from 72 to 36 hours
- IPA distillation cycle time reduced from 192 to 72 hours
- Drum shed containers solvent wise segregated and accumulated Qty. used for Column Distillation.

LS-2 PROJECT PROPOSALS

- Planned Columns = 6 No’s
- Reactors = 4 No’s
- Recovery planning per Month = 1200 KL
- To avoid outside solvent Job work

LS-3 PROJECT PROPOSALS

- Planned Columns = 2 No’s (From Pharma Chem Unit-II)
- Reactor Columns (2 No’s) under discussion.
- Additional Columns Recovery Quantity planning per Month = 400 KL
- To avoid outside solvent Job work

THANK YOU